Mokelumne river streambank improvement project

Applicant: East Bay Municipal Utility District

Scope: The proposed project will consist of the installation of approximately 4,000 feet of exclusionary fencing, developing an off-stream water supply for livestock, seeding the exclosure with native grasses and forbs and planting approximately 2000 native trees. The rehabilitation site is located adjacent to the Mokelumne River approximately 1-1/2 miles downstream of Camanche Dam on the south side of the river in Township 4N, Range 8E, Section 12.

The 5-strand barbed-wire fence will be installed approximately 25 feet from the streambank and will exclude approximately 2.3 acres from livestock grazing. The fence will have two gates installed to allow for access and removal of any stray livestock. The off-site watering facility, composed of piping from the river to two troughs, will provide an adequate water supply for the existing livestock. Fremont cottonwood, California sycamore, willow, valley oak, box elder, alder and/or Oregon ash will be planted in the exclosure and the entire area will be seeded with a mix of native riparian grasses and forbs. Fence construction, off-stream water development and revegetation will be conducted in fall 1999.

Justification and benefits: The Mokelumne River is a major tributary to the Sacramento-San Joaquin Delta. Five species of anadromous fishes; fall-run chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), American shad (*Alosa sapidissima*), striped bass (*Morone saxatilis*), and Pacific lamprey (*Lampetra tridentata*) are present in the lower Mokelumne River.

Due to their value as a sport and commercial fishery, chinook salmon are considered the primary focus in management of the lower Mokelumne River (CDFG 1991). The California Department of Fish and Game (CDFG) has determined that the lower Mokelumne River between Camanche Dam and its confluence with the Delta is of considerable importance for restoration and maintenance of chinook salmon and steelhead (CDFG 1991). Since life stage requirements for steelhead trout are generally similar, steelhead often benefit from implementation of management proposals for salmon (CDFG 1991).

The river and its living creatures are directly linked to the adjacent riparian zone, and should be considered part of a larger interacting system that includes an aquatic instream portion and an adjacent, terrestrial portion.

The shading effect of riparian vegetation provides significant temperature-moderating effects to the adjacent river. This cooling effect can determine the suitability of rivers for salmonid habitat. It has been demonstrated that lack or removal of shading along rivers can increase water temperature by 12 to 181F. Shading also can significantly diminish daily temperature variations in streams, which has important ecological effects.

Riparian vegetation protects river banks from erosion through reduction of water velocity, soil binding by root masses, and the presence of ground litter, which impedes the rate of surface runoff. It promotes deposition of silt as new soil during periods of flood, without which key riparian species such as willows and cottonwoods could not reproduce. It also provides important substrates for aquatic insects and escape and resting cover for many fish species. The dead organic matter or detritus and to a lesser extent, live invertebrates from riparian vegetation, are important sources of nutrients.

Rivers passing through agricultural lands are often adversely affected by livestock. Livestock can breakdown streambanks, destroy riparian vegetation, and by constant grazing, prevent new vegetation from becoming established. Overgrazed streambanks are highly susceptible to erosion and can add a significant amount of fine sediment to a stream.

The Draft Anadromous Fish Restoration Program Plan (1997) recommends the enhancement and maintenance of the riparian corridor on the lower Mokelumne River to improve streambank and channel rearing habitat for juvenile salmonids and categorizes the action as a high priority. The proposed CALFED long-term implementation actions include the restoration of a minimum of 1,240 acres of self-sustaining or managed diverse natural riparian habitat along the lower Mokelumne River.

The objectives of the proposed Project are to reduce streambank erosion and the subsequent input of fine sediment into the salmonid spawning gravels, increase the riparian canopy to reduce stream temperatures and provide important substrates for aquatic insects and escape and resting cover for fish. This project will help improve natural production of chinook salmon and steelhead stocks in the Mokelumne River which will conserve the genetic diversity of these stocks and species. Maintaining genetic diversity provides the genetic basis by which populations can respond to fluctuating environmental conditions, which is essential to survival. Individual populations, or stocks of anadromous salmonids are adapted to the local environmental conditions of the their natal stream systems, hence, a wide range of genetic variability exists between them. Loss of individual stocks will most likely lead to loss of genetic diversity and ultimately to changes in genetic composition of the species as a whole and a reduction in biological and genetic diversity and the ability to adapt to environmental changes.

Monitoring and data evaluation: The 5-strand barbed-wire fence will be operated and maintained for 10 years. Plants will be monitored for three years after planting and any trees not surviving during the monitoring period will be replaced.

Work to be performed and deliverables:

Work to be completed under the scope of services includes:

- Purchase and install approximately 4,000 linear feet of 5-strand barbed wire fence

Purchase and install an off-channel livestock watering source
Purchase and plant native grasses and forbs and approximately 2000 native trees

Work already completed or to be completed under separate funding includes:

Project management
Securing access, easement and indemnification from the landowner
Preparation of environmental documents and permitting
Biological evaluation and monitoring
Fence repair and maintenance
Replacement of trees lost during monitoring period

Budget:

Fence (materials and installation)	$ 4,000
Off-stream water development (materials and installation)	$16,000
Purchase and plant 2,000 trees and seed	$28,000
Total:	$48,000